Code No: R05410302 **Set No. 1**

IV B.Tech I Semester Regular Examinations, November 2008
CAD-CAM
(Common to Mechanical Engineering, Metallurgy & Material Technology, Production Engineering and Aeronautical Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Briefly explain the conventional process of the product cycle in the conventional manufacturing environment. [16]
2. What is the need for concatenation of transformations? Explain what care should be taken in such cases. [16]
3. What are the types of surfaces that CAD/CAM systems use? [16]
4. Give an example of how the centralized integrated database concept can help with the what-if situations that arise during the design process. [16]
5. The part in the following figure 5 is to be drilled on a turret-type drill press. The part is 15.0 mm thick. There are three drill sizes to be used: 8 mm, 10 mm, and 12 mm. These drills are to be specified in the part program by tool turret positions T01,T02, and T03. All tooling is high-speed steel. Cutting speed = 75 mm/min and feed = 0.08 mm/rev. Use the lower left corner of the part as the origin in the x-y axis system. Write the NC part program. Use absolute positioning. All dimensions are given in mm. [16]

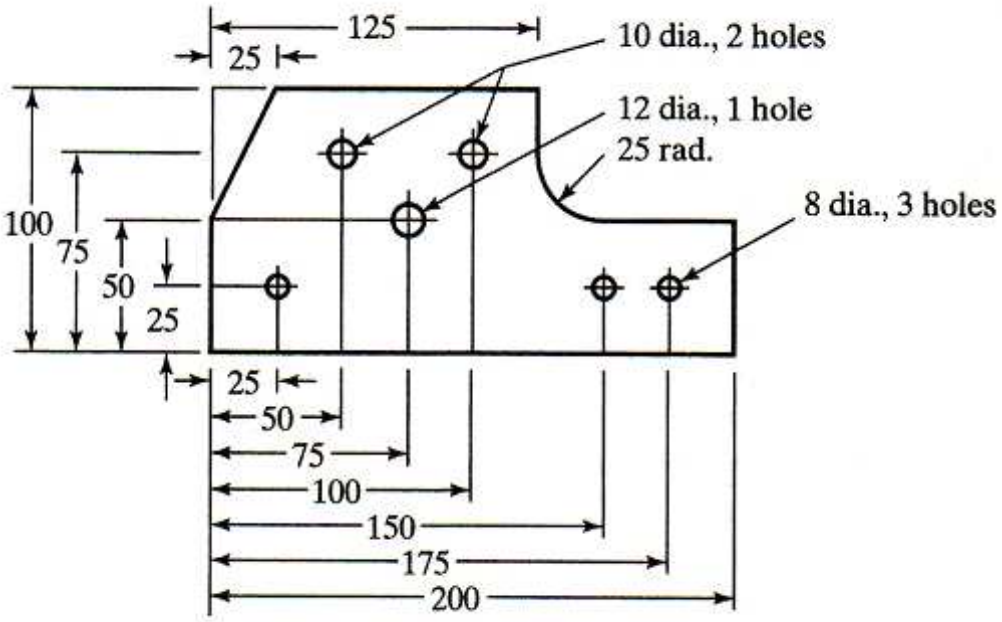

Figure 5

6. Apply the rank order clustering technique to the following part-incidence matrix to group parts into part families. Minimum duplication of machines is allowed. [16]

Machines	Parts								
	A	B	C	D	E	F	G	H	I
1	1	1		1				1	
2					1				1
3			1		1				1
4		1		1		1			
5	1							1	
6			1						1
7		1				1	1		

7. Describe the configuration of DNC system. [16]

8. Explain JIT production system with respect to the following: [5+5+6]

   (a) Batch size

   (b) Setup time

   (c) Product schedule.

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Code No: R05410302 **Set No. 2**

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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
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1. (a) How do you specify a plotter for graphics application?
   (b) Explain the four types of production. [16]

2. Explain the method of back face removal. Give its advantages and limitations with reference to hidden line removal. [16]

3. What do you understand by the form element method of geometric construction? Specify the applications of this method of modeling in comparison to that of the variant type. [16]

4. Three point sets in E^2 define three valid polygonal solids S_1, S_2 and S_3. The three solids are bounded by three boundary sets bS 1, bS_2 and bS_3 given by their comer points as: $bS_1 := \{(2,2),(5,2),(5,5),(2,5)\}$, $bS_2 = \{(3,3),(7,3),(7,6),(3,6)\}$ and $bS_3 = \{(4,1),(6,1),(6,4),(4,4)\}$. Find $S_1 \cup S_2 \cup S_3$, $S_1 \cap S_2 \cap S_3$ and S_1 - S_2 - S_3. [16]

5. (a) Describe the Binary coded decimal system used in NC machines for part programming.
   (b) Why is parity check provided in NC punched tapes? [10+6]

6. The following table lists the weekly quantities and routings of ten parts that are being considered for cellular manufacturing in a machine shop. Parts are identified by letters and machines are identified numerically. For the data given,
   (a) develop the part machine incidence matrix, and
   (b) apply the rank order clustering technique to the part-machine incidence matrix to identify logical part families and machine groups. [16]

Part	Weekly Quantity	Machine routing
A	50	$3 \rightarrow 2 \rightarrow 7$
B	20	$6 \rightarrow 1$
C	75	$6 \rightarrow 5$
D	10	$6 \rightarrow 5 \rightarrow 1$
E	12	$3 \rightarrow 2 \rightarrow 7 \rightarrow 4$

7. In which type of production, FMS is applied? What are the advantages of FMS? [16]

8. Compare Lean Manufacturing with Mass production. [16]

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Code No: R05410302 **Set No. 3**

IV B.Tech I Semester Regular Examinations, November 2008
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. Briefly describe the types of storage devices used in computers. [16]
2. Explain the concept of obtaining a reflection about an arbitrary line starting from the plain reflection about an axis. How do you obtain the orthographic projections of 3D geometric data base? [16]
3. What are the limitations in utilizing the sweep method for geometric construction? [16]
4. Give an example of how the centralized integrated database concept can help with the what-if situations that arise during the design process. [16]
5. The top surface of a large cast iron plate is to be face milled. The area to be machined is 400-mm wide and 700-mm long. The insert type face milling cutter has eight teeth and is 100 mm in diameter. Define the origin of the axis system at the lower left corner of the part with the long side parallel to the x-axis. Write the APT geometry and motion statements for this job. [16]
6. Write the steps involved in Production flow analysis. Why do you carryout such analysis? [16]
7. Describe the role of RS232C, DNC and LAN in integrating various components of FMS. [16]
8. Explain JIT production system with respect to the following:
   (a) Inventory
   (b) Quality control
   (c) Production line. [5+5+6]

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Code No: R05410302 **Set No. 4**

IV B.Tech I Semester Regular Examinations, November 2008
CAD-CAM
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Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) What is the structure of a computing system?
   (b) What do you understand by the CPU? [16]
2. Briefly explain the requirements for a graphic database. [16]
3. Investigate the statement "each segment of a B-spline curve is influenced by only k control points or each control point affects only k curve segments". Use n = 3, k = 2,3,4. [16]
4. (a) What are the different types of geometric relations? Why would you use them in 3D geometric modeling?
   (b) How can you define a sketch plane? [16]
5. A turning operation is to be performed on an NC lathe. Cutting speed = 2.5 m/sec, feed = 0.2 mm/rev, and depth = 4.0 mm. Work piece diameter = 100 mm and its length = 400 mm. Determine
   (a) the rotational speed of the work bar.
   (b) the feed rate,
   (c) the metal removal rate and
   (d) the time to travel from one end of the part to the other. [16]
6. Describe the Optiz classification system in detail. [16]
7. A flexible machining system consists of two machining workstations and a load/unload station. Station 1 is the load/unload station. Station 2 performs milling operations and consists of two servers (two identical CNC milling machines). Station 3 has one server that performs drilling (one CNC drill press). The stations are connected by a part handling system that has four work carriers. The mean transport time is 3.0 min. The FMS produces two parts, A and B. The part mix fractions and process routings for the two parts are presented in the table below. Determine,
   (a) maximum production rate of the FMS,
   (b) corresponding production rates of each product,
   (c) utilization of each station and
   (d) number of busy servers at each station. [16]

Part	Part Mix	Operation	Description	Station	Process time (min)
A	04.	1	Load	1	4
		2	Mill	2	30
		3	Drill	3	10
		4	Unload	4	2
B	0.6	1	Load	1	4
		2	Mill	2	40
		3	Drill	3	15
		4	Unload	1	2

8. Describe hardware configuration of CIM with the help of a sketch. [16]

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